Reformulated Gasoline: Five Years Later

By Dennis Koepke, Wisconsin Department of Natural Resources

During the winter of 1994-1995 reformulated gasoline appeared at the pumps throughout southeastern Wisconsin. The 1990 Clean Air Act Amendments required this cleaner burning gasoline to be sold in areas with severe ozone nonattainment status, including Milwaukee, Chicago, and Gary, Indiana, as well as Baltimore, Boston, Dallas, Houston, New York City, and Washington, D.C.

In many areas of the country, including metropolitan Chicago, consumers hardly noticed the new gasoline. In southeastern Wisconsin, however, as well as in some areas of Pennsylvania and Kentucky, consumers were very unhappy with the "government gas." Five years later it is time to check in on reformulated gasoline and see where we are and where we are going.

High octane anger

A few months after RFG entered local gas pumps, complaints about the new gasoline began to escalate. Complaints included high prices, bad odors, poor gasoline mileage, and health concerns. The U.S. Environmental Protection Agency, the Department of Natural Resources, and the Wisconsin Division of Health began a series of investigations on reformulated gasoline. At the same time, oil companies began to switch the way they blended reformulated gasoline away from using MTBE (methyl tertiary butyl ether) to using ethanol.

The studies found that no specific adverse health affects could be attributed to reformulated gasoline. A performance test of cars and trucks found that, on average, cars and trucks were getting about 3 fewer miles per gallon. Although the price of gasoline continues to bounce around, the large price

differences between reformulated gasoline and conventional gasoline now average less than 2 cents per gallon. Finally, as the oil companies switched to using ethanol rather than MTBE, the complaints about stinky gasoline largely disappeared.

How does reformulated gasoline work?

Like all gasoline, reformulated gasoline is a complex blend of refined crude oil products mixed with small amounts of additives to improve performance. To reduce air pollution, reformulated gasoline is blended to burn more completely and to be less likely to evaporate. Gasoline contributes to air pollution when it does not burn completely and is shot out of the tailpipe into the air, or when it evaporates and its vapors are released into the air through microscopic leaks in fuel lines and from vapors released when filling up gas tanks. These pollutants, called "volatile organic compounds," are part of the mix of air pollution that causes "smog" or ground level ozone to form on hot summer days.

The Clean Air Act also required that oil companies add "oxygenates" to reformulated gasoline. Oxygenates are additives such as ethanol or ethers such as MTBE. In southeastern Wisconsin and in the Chicago area, virtually all of the reformulated

gasoline that is sold uses ethanol as the oxygenate additive. When gasoline with oxygenates is burned, the engines will produce less carbon monoxide, another type of air pollution. Although carbon monoxide plays only a small role in forming ground level ozone, it is a pollutant of concern in its own right.

Finally, the Clean Air Act also required that reformulated gasoline produce fewer toxic emissions such as benzene, a known carcinogen.

Is the air cleaner?

Every summer, across the nation, reformulated gasoline prevents 36,000 tons of smog-forming pollution from getting into the air. The EPA estimates that this is equivalent to the pollution from over 8 million cars burning conventional gasoline. This reduction of about 9 pounds for every vehicle that is using RFG really adds up when you realize that there are more than 1,000,000 vehicles in southeastern Wisconsin. Air pollution monitors have also detected a 43 percent drop in benzene levels in areas using reformulated gasoline.

In Wisconsin, reformulated gasoline accounts for over 25% of our air pollution reductions since 1990. Reformulated gasoline is the biggest single control measure in Chicago. The reformulated gasoline program has helped Milwaukee get ranked as one of the top 10 cities in America for reducing air pollution.

Next steps

Beginning in the summer of 2000 Phase 2 Reformulated Gasoline will be introduced in cities across America. This version of reformulated gasoline will more than double the pollution reductions compared to the current reformulated gasoline. Phase 2 RFG will further reduce air pollution from volatile organic compounds and toxics. It will also be the first blend of gasoline to reduce pollution from nitrogen oxides, which also form smog. Compared to conventional gasoline, the next phase of reformulated gasoline will reduce toxic emissions by 22%, volatile organic compound emissions by 27%, and nitrogen oxide emissions by 7%. The next phase of reformulated gasoline is expected to cost 1 to 2 cents more per gallon to produce.

The new version of reformulated gasoline has been extensively tested. Over 1 million miles have been driven using Phase 2 gasoline. These tests included a municipal fleet in suburban Chicago, the Boston Police Department, a fleet of trucks owned by an electric utility in Houston. Wisconsin manufacturers Harley Davidson and Mercury Marine have also tested the gasoline in small engines. These tests showed no changes in performance or mileage when compared to our current reformulated gasoline.

For more information about Phase 2 reformulated gasoline, contact Dennis Koepke, Wisconsin DNR, Bureau of Air Management, at 608-264-8868, e-mail koepkd@dnr.state.wi.us.

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For more information about reformulated gasoline, visit these USEPA web sites:

- Reformulated gasoline and your motorboat, http://www.epa.gov/ARD-R5/mobile/boatfact.htm
- Reformulated gasoline and your snowmobile, http://www.epa.gov/ARD-R5/mobile/snowmo.htm
- Winterizing your lawnmower and lawn and garden equipment, http://www.epa.gov/ARD-R5/mobile/winter.htm